National Aeronautics and Space Administration

MARSHALL STAR

Serving the Marshall Space Flight Center Community

May 6, 2010

SpaceOps 2010

Marshall-hosted conference draws record-breaking 800 participants

By Megan Norris Davidson

More than 800 experts and innovators in the global space operations community took part in last week's SpaceOps 2010 conference in Huntsville – the largest number of participants in the event's 18-year history.

This year's conference, held April 25-30 at the Von Braun Center, was hosted by the Marshall Space Flight Center and organized by the American Institute of Aeronautics and Astronautics. It gave participants an opportunity to hear new ideas and discuss key topics important to the international space operations community. This was the first time the conference was held in Huntsville, and only the fourth time in the United States.

"The record number of people involved in this year's conference shows the importance of the work we

*See **SpaceOps** on page 6*

SpaceOps attendees take part in one of the conference's many forum sessions April 26 at the Von Braun Center.

Marshall advanced manufacturing technology leads the way into space

By Sanda Martel

When a space shuttle rises from the launch pad at NASA's Kennedy Space Center, Fla., a structural component made at the Marshall Space Flight Center leads the way.

Rising from the launch pad, the 153.8-foot-high external tank towers above the twin solid rocket boosters and orbiter. Since the launch of STS-86 in September 1997, the liquid oxygen tank's top-most portion has flown with a composite nose cone manufactured at Marshall's National Center for Advanced Manufacturing, or NCAM.

At the facility in Building 4707, Lockheed Martin workers make

*See **Nose cone** on page 4*

Countdown to Pad Abort 1 test

NASA's latest flight test, called Pad Abort 1, or PA-1, is scheduled for launch May 6 at the Orion Abort Flight Test Launch Complex 32E at the U.S. Army's White Sands Missile Range near Las Cruces, N.M. The launch window extends from 8-11 a.m. CDT, with liftoff targeted for the beginning of the window.

"PA-1 is part of NASA's ongoing

*See **Test** on page 7*

Marshall Child Development Center holds first practice evacuation to secondary location

Parents, development center staff, community first responders, children work together to make exercise a success

By Jessica Wallace Eagan

Last month at the Marshall Space Flight Center's Child Development Center, 120 children and 30 staff members successfully participated in the first evacuation exercise to a secondary location, Activities Building 4316.

The result: Everyone cleared the building in less than three minutes, meeting the National Fire Protection Association requirements. The Redstone Arsenal Fire Department arrived at three minutes and 55 seconds. Twenty-six minutes later, all children and staff were safely in 4316.

The idea for this exercise came after a recent centerwide fire drill. "We realized that we did not have a plan beyond the fire evacuation assembly areas outside the development center," said Rhonda Pepper, construction of facilities program manager in the Office of Center Operations and development center liaison. "What do we do if we can't go back in? Where do we go? How do we get there? Who tells the parents where to come? The questions kept coming."

So seven Marshall team members took action to come up with a plan. The Evacuation Exercise Team included Kelli Wright, director of the development center, and Cecilia Finn, its assistant director, both supporting Center Operations; Rob Johnston, security supervisor, and Shawn Jayne, security specialist, both of Coastal International Security, supporting Center Operations; Larry Ziegler, fire protection engineer of Bastion Technologies, supporting the Safety & Mission Assurance Directorate; Jack Chapman, an aerospace engineer in the Engineering Directorate and representing the development center's board of directors; and Pepper.

It was decided that Building 4316 was the best evacuation destination because the area had the capacity to handle 150 occupants with restrooms, and accessibility for parents to quickly pick up their children.

"We then began working on how to get everyone out and to 4316," said Pepper. "Ground transportation was not feasible due to logistics and timing. We needed to travel on foot. We have evacuation beds for the children who cannot walk. We performed trial runs of possible routes with the beds loaded down with boxes of paper to simulate the weight of children, which worked out great."

During the evacuation exercise, the staff and children walked briefly along Morris Road. They crossed the road and walked along the east side of the Wellness Center, Building 4315, to the front, then continued next door to 4316. The Wellness Center will serve as a resting place in case children need to stop.

Pepper said that planning for a proper evacuation has continued since the exercise. They are developing an inclement weather evacuation plan, and planning for a backup

See ***Practice*** *on page 3*

Rolling babies from the development center to Building 4316 during a practice evacuation are, from left, daycare staff members Freda Ayers, Yvonne Wood and Janice Parker. They support the Office of Center Operations. In the background is Tony Ceci, a Huntsville Emergency Medical Services Inc. paramedic, also supporting Center Operations.

NASA managers hold shuttle review at Kennedy on May 5

By Sanda Martel

NASA managers met May 5 at Kennedy Space Center, Fla., to assess the readiness of space shuttle Atlantis to launch on the STS-132 mission to the International Space Station. The targeted launch date is May 14, at 1:20 p.m. CDT.

In what will be shuttle Atlantis' last scheduled mission, astronauts will deliver an integrated cargo carrier and a Russian-built Mini Research Module-1 to the space station. The carrier contains maintenance and assembly hardware and spare parts for the station. The Russian module, also known as Rassvet, is about 23 feet long and weighs 17,147 pounds. It will provide additional storage space and a new docking port for Russian Soyuz and Progress spacecraft. Soyuz space capsules transport astronauts to and from the space station. Progress cargo vehicles resupply the station.

During the 12-day mission, three spacewalks are planned to store spare components outside the station. Components include six batteries, a boom assembly for the Ku-band antenna and parts for the Canadian Dextre robotic arm extension. Dextre is a robot with two smaller arms capable of handling the delicate assembly tasks formerly performed by astronauts during spacewalks. A radiator, airlock and European robotic arm for the Rassvet module also are payloads on this 34th shuttle mission to the station.

Atlantis lifted off on its maiden voyage Oct. 3, 1985, on mission 51-J. Later missions included the launch of the Magellan probe to Venus on the STS-30 mission in May 1989; the Galileo interplanetary probe to Jupiter on STS-34 in October 1989; the first shuttle docking to the Mir space station on STS-71 in June 1995; and the final Hubble servicing mission on STS-125 in May 2009.

Atlantis is named after a two-masted sailing ship operated for the Woods Hole Oceanographic Institute in Massachusetts from 1930 to 1966. STS-132 will mark Atlantis' 32nd flight and its 11th flight to the space station.

After STS-132, two flights to the space station remain before the shuttles are retired at the end of the year. Discovery is targeted to launch in September on the STS-133 mission to the space station; shuttle Endeavour is targeted to launch in November on the final scheduled mission to the space station.

For more information about the STS-132 mission, visit http://www.nasa.gov/mission_pages/shuttle/main/index.html.

Martel, an AI Signal Inc. employee, supports the Office of Strategic Analysis & Communications.

Practice *Continued from page 2*

location in case Building 4316 is in use.

"Developing and maintaining a great quality of life on the center is critical to the well being of our work force," said Bob Devlin, deputy director of the Office of Center Operations. "For team members with children, having them nearby in a safe and nurturing environment is key to that quality of life. Center Operations and Marshall's leadership are proud of how well our parents, development center workers, community first responders and children worked together to make the evacuation a successful and fun event."

Parents will be notified of future practice evacuations, and will be given information on the procedures. For more information, contact Pepper at 544-5432.

For more information on the Marshall Center's fire evacuation plan, contact Ziegler at 961-0625.

For more information about the National Fire Protection Association, visit http://www.nfpa.org.

David Higginbotham/MSFC

Daycare staff members and children walk along the east side of Marshall's Wellness Center, en route to Building 4316 during a practice evacuation.

Eagan, an AI Signal Research Inc. employee and the Marshall Star editor, supports the Office of Strategic Analysis & Communications.

Nose cone

Continued from page 1

the nose cone of graphite phenolic, a high-temperature composite material designed to withstand the approximate 1,100 degree F. heat experienced by the external tank during launch. A composite is a combination of two or more materials: a reinforcing material for strength and stiffness and a glue or binding material, such as a resin, to surround and hold the reinforcement in place.

"It's a unique process," said Jon Sharpe, senior manager of Huntsville Technical Operations, Lockheed Martin Space Systems. "There's both art and science involved."

The steps in composite nose cone production include precise cutting of the composite material pattern; "laying up," or placing them inside a mold; vacuum bagging; and curing in an autoclave, which applies heat and pressure in a controlled environment. All cones produced at the National Center for Advanced Manufacturing facility were cured in the 9-foot-diameter autoclave located in Building 4707.

Dennis Olive/MSFC

The nose cone production crew – all Lockheed Martin employees – with the last three "golden eggs," or flight cones, they produced. From left, front row, are Robert Carroll, primary machinist; Steve Franklin, quality control; and Ed Kirch, primary lay-up and cure technician. Back row, Thomas Piff, mechanical properties testing; Teddy Wilburn, lay-up, cure and machining support; Jon Sharpe, program manager; Richard Welch, production supervisor; Dave Newman, nondestructive evaluation at Michoud; and David Myers, nondestructive evaluation.

"We have a variety of disciplines at this facility – materials and process engineers, mechanical and chemical engineers and technicians – but the heart of the operation is technicians who cut, measure and form these nose cones by hand to exacting standards and then precision machine them to very tight tolerances," said Sharpe.

Emmett Given/MSFC

Ed Kirch, known by his colleagues as the master of the hand lay-up process, works on his 47th composite nose cone. He has constructed all 50 of the nose cones and is fond of saying he has "birthed" each one.

Upon completion, nose cones are delivered to NASA's Michoud Assembly Facility in New Orleans. During final assembly of the tank, workers install the 56.5-inch-diameter composite nose cone with a series of brackets to the most forward position of the liquid oxygen ogive, or pointed arch, tank section.

Over the past 16 years, 50 composite nose cones have been produced at the Marshall advanced manufacturing facility. Each unit is given a nickname – such as "Baby," "Wilma," "Shady Lady" and "Lucky" – names usually derived from workers' wives, children, mothers and dogs. Cone #50, "De Ja'," will fly on external tank ET-138/STS-133 – the last scheduled shuttle mission. It was shipped to Michoud in October 2009. Two more installation-ready spares were delivered to Michoud in March and another two will not be machined and assembled, but retained as shell-only spares until the end of the Space Shuttle Program.

"With the end of the Space Shuttle Program approaching, we're trying to preserve critical skills such as these to be able apply them to NASA's future needs," Sharpe added.

"The external tank composite nose cone is the only space shuttle propulsion flight-certified hardware component fabricated in the National Center for Advanced

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Nose cone

Continued from page 4

Manufacturing," said Mike Prince, external tank lab lead engineer in Marshall's Materials and Processes Laboratory. "The contractor technical professionals who help make the composite nose cone a reality are extremely talented and highly skilled workers. They have a genuine appreciation for the Space Shuttle Program."

Prince said the facility's experience in maintaining a manufacturing facility certified to produce shuttle flight hardware has ensured its capability to support future program requirements.

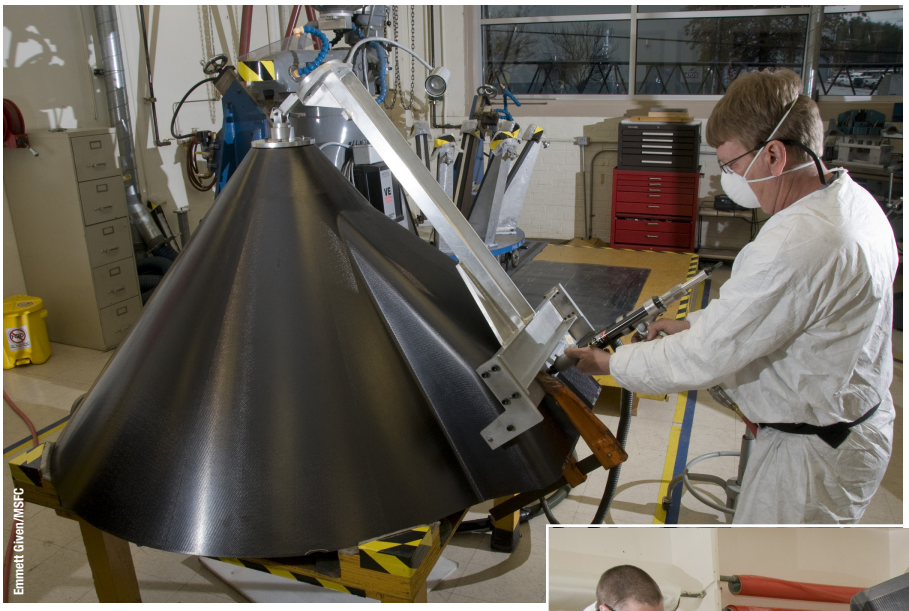
The facility's tooling is part specific and unique to the hardware, Sharpe said. It was designed and built at Michoud by Lockheed Martin, prime contractor for the space shuttle external tank.

"The Marshall NCAM has allowed NASA and the contractor to work hand in hand to the benefit of NASA, giving NASA technical and project personnel a chance to observe and monitor the manufacturing process for this component without having to travel to outside vendors or other manufacturing sites," Sharpe said.

In the late 1980s and early 1990s, the External Tank Project Office pursued development of composite parts to reduce the weight of the external tank, reduce debris potential and reduce the number of parts required to build the nose cone. NASA and Lockheed Martin personnel worked side by side through the development and test effort and in 1996 decided to implement composite nose cone production at the Marshall Center.

Marshall's National Center for Advanced Manufacturing is the agency's primary resource for manufacturing, research and technology development. It provides production and development support for NASA projects and multiple partnerships with industry, academia and other government agencies.

Martel, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.



Emmett Given/MSFC

Robert Carroll drills alignment holes on the nose cone – a critically important task as all holes must align perfectly to fit onto the top of the liquid oxygen tank.

Emmett Given/MSFC

Ed Kirch installs a circular ply cut to fit inside the uppermost position of the nose cone. Assisting are Steve Franklin, center, and Richard Welch.

are doing, and our effort to create relationships and strengthen communications with our national and international partners," said Mike Kearney, a technical assistant for Marshall's Mission Operations Laboratory who served as SpaceOps' technical program chairman.

Themed "Delivering on the Dream," the conference drew representatives from around the country and across the globe, including the German Aerospace Center; the French Space Agency; the Japan Aerospace Exploration Agency; the National Oceanic and Atmospheric Administration; the Canadian Space Agency; and most NASA field centers. "This event really helps strengthen and further NASA's international collaboration efforts, and overcome space operations challenges," Kearney said.

SpaceOps 2010 Conference participants check out the 21st Century Technologies Control Center Communications interactive exhibit.

Forum topics at this year's conference included mission design, flight operations, planning, training, and data and communications systems, as well as the newly introduced topics of launch operations and commercial space operations.

Also, students and teachers from several Huntsville-area high schools, colleges and universities participated in an educational outreach career panel focused on science, technology, engineering and mathematics. The session gave the students and teachers an opportunity to hear directly from a panel of distinguished scientists and engineers about their motivations to pursue their careers. A question-and-answer session followed. The career discussion was funded and sponsored by the NASA Headquarters Exploration Systems Mission Directorate, and organized by Marshall's Office of Strategic Analysis and Communications and the Academic Affairs Office within Marshall's Office of Human Capital.

Kearney pointed out several new elements that were incorporated in this year's event: Sponsored by NASA, the 21st Century Technologies Control Center Communications exhibit gave attendees an inside look at how the Launch Control System at Kennedy Space Center, Fla., the Mission Control Center at Johnson Space Center in Houston, and Marshall's International Space Station Payload Operations Center operate and work together on a daily basis.

The new electronic poster session provided participants the opportunity to use software, videos and other electronic devices for their presentations on a variety of space-related topics, rather than the traditional paper poster.

Speakers throughout the week included Marshall Center Director Robert Lightfoot and NASA Associate Deputy Administrator Charles Scales. Gene Kranz – best known for his role in directing the successful mission control team efforts to save the crew of Apollo 13 – gave the keynote speech at the event's Gala Dinner, held April 29 at the Davidson Center for Space Exploration.

There, Kranz was honored with the 2010 International SpaceOps Exceptional Achievement Medal for pioneering the concepts and procedures that laid the foundation for human spaceflight operations – many of which are still in use today. He was also cited for his inspirational leadership that raised the awareness of the importance of spaceflight operations throughout the world.

Will Whitehorn, president of Virgin Galactic – an airline that offers suborbital spaceflights – provided the conference's closing remarks.

"We hope attendees came away from the conference with valuable information about missions and programs – both in the United States and abroad – and use that information to better their own projects and initiatives to continue success in all areas of space operations," Kearney said.

Davidson, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.

mission to develop safer space vehicles for all human spaceflight applications," said Stephen Gaddis, deputy manager of the launch abort system, or LAS, at the Marshall Space Flight Center. "Information gathered through PA-1 testing will be valuable in design and development of those future systems.

Testing the LAS performance and LAS to crew module interface are the principal objectives of PA-1. "The integrated LAS system performance cannot be adequately tested except in abort flight test conditions such as PA-1," Gaddis added.

The launch abort system contains three newly designed solid propulsion systems, each of which performs a unique aspect of the abort mission.

The biggest of the three is the abort motor at the bottom of the launch abort system stack. "It's fast and furious, reaching about 500,000 pounds of thrust force in less than a tenth of a second, and accelerating the launch abort vehicle from zero to nearly 600 mph in about four seconds," said Dr. Jeffrey Sheehy, deputy chief engineer for the launch abort system at Marshall. It's designed to extract the crew module from the launch vehicle as quickly as possible so it can be flown to safety in the event of an anomaly during the trip to space.

The jettison motor, in the middle of the stack, is the smallest of the three propulsion systems. It will be used to remove the launch abort system tower from the crew module on every mission. For nominal flights with no abort, the LAS tower is jettisoned at about 55 miles altitude, near the edge of space. In the event of an abort, the tower is jettisoned after the launch abort vehicle has been reoriented. Removing the tower allows the crew module to deploy its parachute systems.

The attitude control motor, near the top of the stack, provides stability control and reorientation propulsion for the launch abort vehicle. "It's a huge advancement in controllable solid rocket technology, representing a 25-fold scale-up over previously flown systems of this type," said Sheehy.

Gaddis praised the NASA team for working long hours to oversee the completion of all tests leading to the Pad Abort 1 flight, performing Hardware Acceptance Reviews for all the flight subsystems, and for verifying the closure rationale for more than 1,300 project requirements.

"The launch of Pad Abort 1 on May 6 will be a history-making event since this is the first new crew escape system that has been developed in over 40 years," said Gaddis. "There is no other system in the world like it and I feel privileged to have been a part of it."

Classified Ads

To submit a classified ad to the Marshall Star, go to Inside Marshall, to "Employee Resources," and click on "Employee Ads — Submit Ad." Ads are limited to 15 words, including contact numbers. No sales pitches. Deadline for the next issue, May 13, is 4:30 p.m. Thursday, May 6.

Miscellaneous

Solid oak bar, brass top, rail, $2,000 obo; 1969 Chevelle rear bumper, $75. 653-4835

Siberian Husky, 4 years old, spayed, light red coat, ice blue eyes, $125. 829-0776

Target writing desk and hutch, Office Depot chair, all $150. 479-4926

Schatz German-made ship's wheel brass aneroid barometer, $200. 508-4379

Two "Trail-Gator" bicycle tow bars, extra seat position kit, $80. 489-5995

One Bonnaroo general admission ticket, $250. 508-0838

KitchenAid washer and dryer, almond, top load, $100 for pair; day bed, $200. 882-3983

Hitachi 60-inch floor model color projection TV, $200. 468-7265

Maytag Neptune electric dryer, white, $150. 430-9774

Chandelier, Cipriani bowl, golden nickel, 6-plus-3 lights, 33"W x 24"H, picture available, $100. 777-1810

Ruger Redhawk revolver, 44 mag, stainless, 5.5 in bbl, $450. 698-5537

360 games, Grand Theft Auto IV, Prototype, Armored Core, Assassin's Creed II, $30 each. 777-7746

16-foot round trampoline, $400; Rip Curl wetsuit, large, $200. 503-7904

44-piece Syracuse china, $500 obo; small round kitchen table, oak finish, $25 obo. 883-1096

Multiple ham radio equipment, any offer. 508-5042

10'X10' screened gazebo, beige iron corner supports, anchor ties, $125. 325-4111

Set of 45-pound Cap brand, hex-shaped dumbbells, $60. 348-4139

Playstation 3 game, Little BIG Planet, Game of the Year edition, rated E, $35. 828-1234

Vehicles

2008 Honda Accord Coupe EX-L, blue pearl, V6-260HP, ground effects, iPod/6CD, 19.7k miles, $21,500. 604-9951

2007 Toyota Highlander, 46k miles, $16,725. 881-3527 or 520-6950

2003 Harley Heritage Softail Classic 100th Anniversary, blue, windshield, leather saddlebags, 5k miles, $12,500. 683-8409

1998 18-foot Stingray RS180 Bowrider, new 140HP, bimini covers, custom trailer, extras, $9,500. 640-6427

1996 Crown Victoria, 20 MPG, 170k miles, $1,000. 698-8834

1996 Ducati 900 SS/CR, red, 13k miles, $3,500. 407-304-7704

1995 Mazda 626, 200k miles, $1,350; 1985 Mazda 323, 300k miles, $600. 694-9124

1969 Mercury Cougar, maroon, partly restored, auto, power steering, 351 Windsor, 168k miles, $5,000. 694-0880

Free

Female Border Collie/Beagle mix, 1 year old, spayed, all shots, house broken. 509-7151

Black Labrador Retriever puppies, 7 weeks old. 658-3960

Three kittens, black with gray stripes, born March 22. 348-8350

Wanted

New or used baby jogging stroller. 931-273-9563

Small boat for pond use. 486-4400

Used Monopoly games, boards, 20"x20" size, pieces. 679-5916

Piano instructor for an adult beginner. sltiernan2010@yahoo.com or 694-7275

Houses/offices to clean, available evenings/weekends. 777-8595 leave message

Handyman help for small electrical, plumbing jobs, no rush, flex time okay. 325-8126 or jackiesheldon@earthlink.net

Lost

Gold and Onyx ring, ASC engraving, reward. 489-5557

Found

Honda car key, Building 4200 south parking lot, April 28; set of Ford car keys, Parker Ford dealer key ring, Building 4203, first floor women's bathroom, Jan. 7; bracelet, Building 4200, April 27. 544-4680

NASA issued press release 50 years ago this spring detailing plans for Marshall

By Mike Wright

Plans for opening the Marshall Space Flight Center in Huntsville on July 1, 1960, hit high gear 50 years ago this spring.

NASA distributed a press release announcing that Marshall would be "the only self-contained organization in the nation which is capable of conducting the development of a space vehicle from the conception of the idea, through production of hardware, testing and launching operations."

The center, under the direction of Dr. Wernher von Braun, would have charge of developing and launching NASA's space vehicles, and conducting related research and launching operations. About 5,500 employees from the Army Ballistic Missile Agency at Redstone Arsenal were expected to transfer to NASA and form the nucleus of the new center.

That group had already developed the Redstone and Jupiter ballistic missiles, and conducted several outstanding space projects. These included the launch of the Free World's first satellite of the Earth – Explorer I – on Jan. 31, 1958, and America's first satellite of the sun – Pioneer IV – on March 2, 1959, along with the successful flight and recovery of monkeys Able and Baker on May 28, 1959.

In October 1959, President Dwight Eisenhower recommended transferring the Army Ballistic Missile Agency's Development Operations Division and its associated facilities to NASA. Congress approved, and in early 1960, the president said he intended to name the new NASA center in honor of the late general of the U.S. Army, George C. Marshall.

That spring NASA followed with a press release, detailing the center's anticipated organizational structure and its future missions. To read the entire release, visit http://history.msfc.nasa.gov/marshall/index.html.

Wright is the Marshall historian in the Office of Strategic Analysis & Communications.

A role model for a bright future

Elvia Paola Renova, right, an aerospace engineer in the Space Systems Department of the Marshall Space Flight Center's Engineering Directorate, talks with Hispanic high school students during the 5th annual Alcanzando Metas, or "Achieving Goals," conference, held April 30 in Activities Building 4316. More than 60 students from schools across Huntsville and Madison County met with Marshall team members, took part in seminars and activities, and pondered careers tapping their science, technology, engineering and math skills. The event was organized by Marshall's Office of Diversity & Equal Opportunity, with the support of the Office of Human Capital. To learn more about Alcanzando Metas, visit http://www.ametas.com.

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